September 1995 Volume XXII Issue 9

Hamsplatter

Did everyone enjoy the long Labor Day weekend? A great opportunity to play outdoors, check out the giant marshmallow, listen to Spike and the Bulldogs, or whatever, and Mother Nature couldn't have cooperated more.

All of the wheels are in motion, and rolling toward what promises to be the grandaddy of all Fort Wayne Radio Club Hamfests. Many THANKS to Cliff (N9MKB) and Jean (N9PXF) for a super job of chairing and coordinating this year's hamfest. Also a THANK YOU to the large number of volunteer workers who have signed up to help. Without this great support, our FWRC hamfest would not be what it is today.

Code and theory classes will begin at 7:30 on September 18 at ITT on Coldwater road. An excellent opportunity to get a ham ticket or work on an upgrade, so let's fill those seats! Anyone with questions please contact Bill Kindred (WA9RAP).

We are actively looking for a few good people--W9TE want's you!! Now is the time to join the repeater maintenance team. Anyone who is interested in learning how repeaters, autopatches and controllers work, here is your chance. The Fort Wayne Radio Club currently uses and enjoys 4 different repeaters, with the possibility of 2 more, and from time to time they all will require maintenance and upgrading, to support and further our hobby. There is no reason this responsibility should be placed on one or two members, we need additional people to jump in and become involved.

Have you been wondering what else there is in our hobby to dabble in? Well, the coming FWRC September 15th meeting will feature as our speaker, Dave Zeph (W9ZRX) who will discuss one of the most interesting facets of Amateur Radio, contesting. If you think you know what contesting is all about but have never been involved, then chances are you are missing something. Dave has built one of the most successful Multi-Multi contest stations in the Midwest, as well as operated as DX during worldwide contests. Come and hear how interesting and how much fun contesting can be.

The meeting starts at 7:30 at the Salem Church clubhouse on Lake Avenue. See everyone there!!

73's

Carl (N9NRO)

Help Wanted: Hamsplatter Editor

We are looking for someone with a 486 computer and some spare time to help construct the monthly Hamsplatter newsletter. Your responsibilities would simply be to incorporate the president's column, minutes, DX/Communications articles, sale ads, special contributor columns and other miscellaneous articles into the final electronic copy. You can even add your own editorials and literary works, if so inclined.

The prospective editor will not be responsible for the printing, copying, and mailing of the newsletter - this will still be performed by Kris, KF9AW.

You will be provided with the Club's Copy of WordPerfect 6.0 for Windows (3.1) and the Mustek graphics/text scanner. A two month (or more, if needed) apprenticeship will also be offered to get you up to speed.

Some hardware that will be necessary for the job:

* An 80486-based Personal Computer, 33 MHz or better w/ mouse.

* 4 MB RAM, 30 MB free on hard drive.

* VGA or VESA high resolution color graphics monitor.

Optional hardware that will make your job easier:

* Telephone modem w/ terminal program or packet radio station - electronically download files.

* CD ROM drive - for adding clip art graphics.

If you want to try your hand at writing a first-class newsletter, give me a call! My work number is 487-3286 and home number is 486-7324.

Thanks for your consideration,

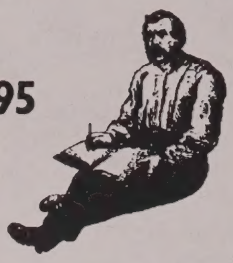
Kris, KF9AW

Fort Wayne Radio Club
Since 1920

The HAMSPLATTER is published monthly by the Fort Wayne Radio Club, PO Box 15127 Fort Wayne, IN, 46885

Kris Staller, KF9AW Editor/Com Mgr 486-7324; Carl Rittenhouse, N9NRO, President 485-4012;
Clifford Shreve, N9MKB, Vice President 483-7570; Al Burke, WB9SSE, Secretary 637-1989; Scott Sides, N9PXG, Treasurer 744-3478;

August 1995 Minutes



The following are the recorded minutes of the Fort Wayne Radio Club:

The August meeting of the Fort Wayne Radio Club was called to order at 7:30 pm by the president Carl Rittenhouse. The minutes were read and approved.

Scott Sides gave the treasurers report as follows: a double payment was made last month to I&M; the Club gave $78.00 to Joann Sweet due from the club auction; $102.03 was spent for repairs on skycam. $20.00 were put in the account for the U.S. Post Office to cover postage.

Introductions were made.

Carl Rittenhouse gave the report on the foxhunt: it was a team effort involving over six mobile fox hunters working together to locate Jim Pliett's remote J-Pole transmitter, hidden behind K-Mart Plaza's Colonial Rib & Pizza bar. The September hunt will be competitive with all hunters working on their own.

OLD BUSINESS:

Cliff reported table sales were going as expected. Volunteers were reported as needed to help with the hamfest in all capacities - any help would be greatly appreciated.

Bill Kindred reported code and theory classes would. begin September 18 at ITT Tech, Coldwater Rd, at 7 pm for 6 weeks on Monday and Thursdays.

It was announced that the next morning, Saturday August 19th, would be have a distribution of hamfest fliers to selected businesses. Volunteers were solicited for the distribution. The effort was headed up by Dave Evans and Carl Rittenhouse.

The Club was given two free tickets for Danville, Ill, free to anyone interested.

Club t-shirts are still for sale for $15.00 each. If you want your name and call on shirt there will be an additional cost of $5.25.

The Club is still negotiating on the '94 repeater. To keep the autopatch, which has reverse capability, the Club would need to spend $55 per month. The 6 meter link will be maintained.

NEW BUSINESS:

The Club is looking for volunteers to serve on repeater maintenance committee. Three to four people are needed to serve on the committee. Anyone interested should contact Carl Rittenhouse.

The program was on radio controlled airplanes and was presented by Dave Beltz, KF9DE. Everyone found this very informative and an interesting aspect of the hobby. Dave brought with him one of his planes, the different remote units and other accessories that go with RC aircraft control. He presented a video of past airshows, including footage of operational B17 and B29 scale aircraft.

Next months program will be on Amateur Radio Contesting presented by Dave Zeph, W9ZRX.

Respectfully submitted by Jean Anderson N9PXF

FCC Proposes UHF-FM Family Radio Service - W5YI Report

The FCC released a Notice of Proposed Rule Making (NRPM) on August 2, 1995 which would essentially allow new low power, short range personal radio transmitters to share radio spectrum with the 462 and 467 MHz Citizens Band - Class A (General Mobile Radio Service). The Tandy Corporation has developed the UHF-FM low power 2-way voice Family Radio Service (FRS) radios which will help meet the growing public demand for "an affordable and practical way of direct communication among individuals". The radios are palm-sized, lightweight and will transmit no more than 1/2 watt. Each channel will occupy only 12.5 kHz of spectrum and the radios will be limited to vertical polarization. They are designed to help families and friends to maintain close contact at sporting events, shopping malls, parks, and between vehicles during trips. The FRS units will utilize CTCSS private channel calling and may have programmable tone-encoded ID numbers to allow accessing of individuals and groups of users.

Tandy has already conducted extensive field tests in numerous situations, both in and outdoors, including residential and shopping areas, office buildings, sporting arenas, open fields, across water, vehicle-to-vehicle, and recreational parks, such as Disney World. Based on its research, Tandy petitioned the FCC for the FRS spectrum, offering that the system would use the seven unused and seven interstitial (between channel frequencies) channels of the GMRS service. In this way, there would be no impact on present spectrum users.

There was a formal protest filed by a GMRS user association in Ann Arbor Michigan, contending that the mixing of licensed and unlicensed users on the same frequencies would "disrupt and impair both current and future GMRS operations".

On August 2nd, the FCC agreed with Tandy and issued the NRPM. The FCC cited several factors used by Tandy which would limit the interference of FRS units. The first is the line-of-sight propagation characteristic of frequencies in the UHF domain. The second factor quoted was the simple, integral antenna design of the units and low power usage which would restrict the range of the FRS units. The FM "capture effect" (the phenomenon whereby the strongest signal received on a frequency is the only signal that is demodulated by the FM receiver tuned to the frequency) was also cited as a reason why the FRS units would not interfere with the GMRS stations.

The FCC agreed with Tandy, Motorola, and TIA that the simplicity of the FRS and its attractiveness to the public would highly depend on the service having no licensing requirements.

New RFI Book From the FCC

-KA8EM, SMARS Feedback

The Federal Communications Commission has released a new Interference Handbook for consumers. The 24-page, full color book will be stocked by FCC field offices around the country to provide people experiencing interference to home electronic equipment with information and solutions to interference problems.

The book deals not only with interference to televisions from radio transmitters, but also illustrates and describes interference caused by poor antennas (weak signals, ghosting); electrical interference from home devices such as hair dryers; electrical interference from power lines; and interference from home computers and low power radio devices such as garage door openers In addition to interference to televisions, the hand book describes solutions to interference to hi-fi systems, telephones, and video cassette recorders. Techniques for solving problems include the use of ferrite cores, improving receiving antenna systems, checking cabling, and isolating interconnected units to find the one that is at fault.

The book lists addresses and phone numbers for sources of high pass filters, common mode filters, and band reject filters, ferrites and beads, ac line filters, telephone filters, and interference resistant telephones, as well as an extensive list of manufacturers of home electronic equipment.

Page one of the new FCC Interference handbooks says "Many interference problems are the direct result of poor equipment installation. Cost-cutting manufacturing techniques, such as insufficient shielding or inadequate filtering, may also cause your equipment to react to a nearby radio transmitter. This is not the fault of the transmitter and little can be done to the transmitter to correct the problern. If a correction cannot be made at the transmitter, actions must be taken to stop your equipment from reacting to the transmitter."

ARRL Laboratory Supervisor Ed Hare, KA1CV, says, "This is the statement from the FCC that hams have been waiting for. The book takes a fair and honest approach to explaining responsibilities and cures for interference problems. The FCC team that put this together had done a fine job with a complex technical and emotional subject."

HOW TO REPAIR AN ELECTRONIC INSTRUMENT

- Badger State Smoke Signals

The next two pages cover individual component troubleshooting using a curve tracer. In order to test each part, one must first isolate the failing portion of the circuit. Here is one way to do it -ed:

INTER OSCITER CONTROL CENTRAL TECHNICAL BULLETIN

Step l: Approach the ailing instrument in a confident manner. This will give the instrument the mistaken idea that you know something. It will also impress anyone who happens to be looking, and if the instrument should suddenly start working, you will be credited with its repair. If this step fails to work, proceed to step 2.

Step 2: Wave the service manual at the instrument. This will make it assume that you are at least familiar with the source of knowledge. Should this step fail to work, proceed to step 3.

Step 3: In a forcible manner, recite Ohm's Law to the instrument (CAUTION: before taking this step, refer to some reliable handbook in order to be sure of your knowledge of Ohm's Law), This will prove to the instrument, beyond the shadow of a doubt, that you know something. This is a drastic step and should be attempted only if the first two fail. If this step fails, proceed to step 4.

Step 4: Jar the instrument slightly. This may require anything from a three to a six foot drop, preferably on a concrete floor. You must, however, be careful with this step, because, while jarring is an approved method of repair, you must not mar the floor. Again, this is a very drastic step. If this fails, proceed to step 5.

Step 5: Brandish a large screwdriver in a menacing manner. This will frighten the instrument, and demonstrate your knowledge of the deadly "short circuit" technique. Proceed to step 6.

Step 6: Add a tube...even if the instrument is solid state. This will prove that you are familiar with the instrument's design..This will confuse the instrument and thereby increase your advantage. If this doesn't work, proceed to the most drastic and dangerous step. It is seldom used and is a final resort if all else fails.

Step 7: Think!!!

Wanna Upgrade to Windows 95? Better Check This Out!

-Matt Godell N8WJC SMARS Feedback

Is Windows a virus?? No, Windows is not a virus. Here's what viruses do:

1. **They replicate quickly** - okay Windows does that.

2. **Viruses use up valuable system resources, slowing down the system as they do so** - okay; Windows does that.

3. **Viruses will, from time to time, trash your hard disk** - okay, Windows does that too.

4. **Viruses are usually carried, unknown to the user, along with valuable programs and systems**. Sigh.. Windows does that, too.

5. **Viruses will occasionally make the user suspect their system is too slow (see 2) and the user will buy new hardware.** Yup, that's with Windows, too.

Until now it seems Windows is a virus but there are fundamental differences: **Viruses** are **well supported by their authors**, are **running on most systems**, their **program code is fast, compact and efficient** and they **tend to become more sophisticated as they mature**.

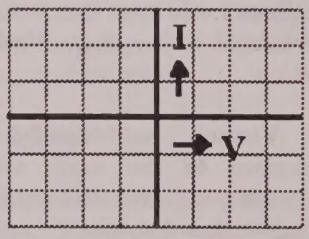
So Windows is not a virus. It's a bug!

Analyzing Circuit Faults with the Versatile Curve Tracer - KF9AW

You've probably seen one of them at a hamfest - a large, ominous hulk of a Tektronix chassis, two worn leather handles on top, weighing in at 95 lbs, and with what appears to be an oscilloscope face and controls for horizontal, vertical, and base axes. It is rare to find one at most medium-size hamfests, and even more rare to find a modern one at Dayton.

To the uninitiated electronics observer, the curve tracer is often mistaken for an oscilloscope. Those who can distinguish the curve tracer from an oscilloscope often think of it as only useful for testing diode breakdown curves and for measuring the gain (or beta) of transistors and FETs. This month, we'll discuss how one can use a curve tracer to safely track down defective components in a failed electronic circuit.

The curve tracer essentially measures the voltage and current across a component and displays it on a two axis screen. The vertical axis shows the magnitude of current, and the horizontal axis shows voltage.



There are separate controls for the horizontal and vertical axes which allow you to select the range of voltage and current that you measure. Typical horizontal increments are measured in volts per division (each square on the screen) and range from 0.1 volts to 100 volts. Vertical increments are in amps per division and range from 1μA to 1 Amp.

A third control section deals with base voltage and current. This is used to select different voltage steps to drive the base of a transistor to measure gain. We will not deal with this control section.

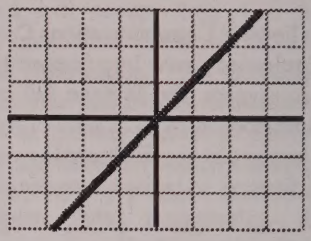
On the base of the curve tracer, you will find two sets of three banana-plug terminals labeled C, B, and E. These are the terminals across which we will measure our components. The C, or Collector terminal, is generally the source, or 'hot' terminal, and the E, or Emitter terminal is the return, or 'ground' terminal. The B (Base) terminal is not needed for fault probing. The two sets of terminals will allow us to connect a known good part and a suspect part to the curve tracer and quickly switch between the two for comparison. The left/right toggle switch between the CBE terminals is used to select which part is under test.

Two other important controls that we will use on the curve tracer are the LIMITING RESISTOR and VARIABLE VOLTAGE SUPPLY. The limiting resistor selector has a range of resistors ranging from 1MΩ to 0Ω. This selects the series resistance that will be in-line with our part-under-test.. A higher resistance setting will limit the amount of current that can flow through the part and will help us to "not let the smoke out of our part". The variable voltage supply is a potentiometer control which is turned clockwise to increase the voltage on the collector terminal. Make sure that is turned fully counter-clockwise before attaching your test parts!

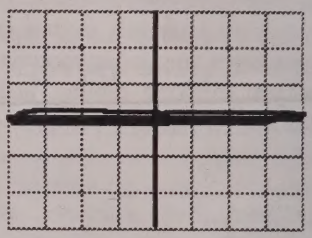
To start out, let's test a simple resistor. We'll set the left/right switch to neutral, select the highest series resistor setting, and put our horizontal scale to 0.1 V / division and the vertical to 1μA / division. Attach one lead of the resistor to the collector terminal and the other lead to the emitter terminal. Switch the left/right switch over to the terminal with the resistor attached. Slowly turn the variable voltage supply clockwise until the 'curve' crosses a few of the screen divisions (don't get into a practice of applying too much voltage where the curve extends off of the screen). Now, if we remember the Ohms Law formula from our Novice theory, we know that:

$$I = \frac{E}{R}$$

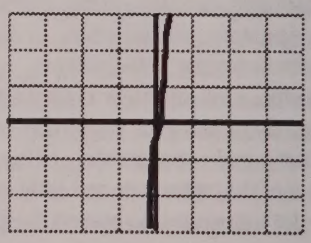
With the resistance remaining constant, the resulting current-voltage plot, or I-V curve, is a straight line. As we apply voltage across our resistor, we'll see an equal, constant increase in current on the vertical axis of the screen:



In the case of this resistor, we get about 1μA of current for each 0.1V of applied voltage, Dividing 0.1V by 1x10-6, we find that our resistor has about 100KΩ of resistance. The slope of the line tells us relatively how much resistance is present. A very shallow or flat line indicates that very little current flows when a high voltage is applied. This indicates higher resistance. A completely flat line shows that no current flows no matter what voltage is applied. This is the characteristic of an open circuit:



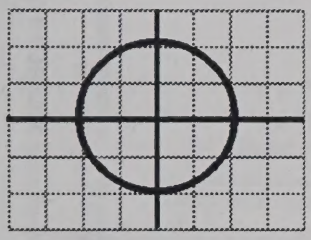
A very steep line indicates that a high amount of current is flowing with little voltage applied. This is typical of low resistance. A completely vertical line on the curve tracer shows that a high amount of current is flowing with no voltage potential applied. This is the characteristic of a short circuit:



We power down the curve tracer by reversing the test steps: rotate the variable voltage control fully counter-clockwise, switch the left/right switch to neutral, and remove the part.

Curve Tracers (continued)

Capacitors have their own unique I-V curve on the curve tracer. When connected across the CE terminals and the right volts/division and amps/division are selected, you will get a circle around the origin which will uniformly expand with applied voltage:

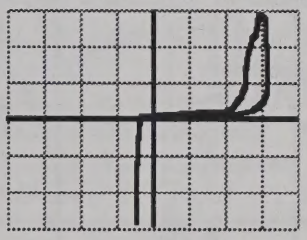


You can roughly 'see' the difference in capacitance when comparing two different value capacitors. The horizontal sides of the circle will expand or contract depending on the increase or decrease in farads. Capacitors which fail electrically tend to generate a resistive short through the dielectric material. On a curve tracer, you will see such a defect as a capacitive loop with a resistive slope:

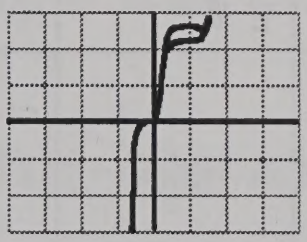
Diodes, transistors, and integrated circuits all contain P-N junctions which 'turn on' at a specific voltage. We can test these semiconductor devices by measuring the breakdown voltages on a known good part, and then comparing to the suspect part. If there is a radical change in breakdown voltages, then it is likely that the suspect part has been electrically damaged.

On ICs, it is often a good practice to "characterize" a known good part by measuring all pins compared to the power and ground pins. Start out by connecting a clip-probe to the power pin and connect the other end of the test cable to the collector terminal of the curve tracer. Attach a second test cable to the emitter terminal of the known good device. If necessary, use graph paper to draw the curves to help you remember what each "good" pin should look like. Never exceed the supply voltage rating of the part on the variable voltage supply - you will probably damage your part! Keep an eye on your vertical current readings as well. As a general rule, don't exceed 500µA when characterizing an IC. Never apply a supply voltage that will take the curve beyond this point. Once you have measured all of your pins to power, check them to ground. Attach your test cable between the ground pin of the device and the emitter terminal of the curve tracer. Step through each pin by attaching them to the collector terminal.

When you have characterized all pins to power and ground, go through the same procedure with your suspect part. Look for any major differences in I-V curves. Pay special attention to any pins that are shorted or open (see previous example curves). A typical IC pin curve trace is shown below. You can see that there is a diode breakdown in the negative voltage range around -.3 volts (assuming 1 volt per division) and a positive diode breakdown occurs around +2.2 volts with some capacitive looping.



Let's assume that we measure this same pin on our suspect part and get the following I-V curve:



We can see that the negative diode breakdown is still about the same on the suspect part, but the positive breakdown occurs 2.1 volts earlier and has a faster current rise. From this, we would conclude that this pin on the suspect part has been electrically damaged. We don't have to know the construction or design of the pins to know if they are bad. All we have to do is compare the shape and breakdowns of the I-V curve to that of a known good part. If you cannot discern any major differences between your known-good and suspect parts, then you can be confident that your suspect part was not at fault.

Another useful step in characterizing a suspect part is to heat it with a hair dryer or chill it with HCFC spray to look for thermal intermittent I-V curves.

OK, we have learned that we can measure open, shorted, and damaged circuits with a curve tracer. Why should we latch onto a curve tracer at the next hamfest and use it for fault isolation?

First of all, the curve tracer can detect shorted or damaged circuits using very little current. By selecting a high series resistor and low current/division ranges, we can detect a short circuit and apply less than 0.2µA into the part. If we tried the same technique using a VOM or digital multimeter on the "resistance" scale, we could apply hundreds of milliamps into the part without any current limiting. You can actually damage a good part by probing it with a DMM.

Secondly, the curve tracer is relatively simple to use. To check a part, you just need to know which pins are power and ground, and the input voltage limit. With a curve tracer, you could literally tell if your $695 Pentium Processor chip is defective, without having to know the part construction, and without risking damage.

! Always wear an ESD dissipative wrist strap when handling ICs and transistors.

You can find the Tektronix 575 curve tracer at most hamfests for under $100. The only drawback to the 575 is that you have to manually switch the supply voltage polarity and it weighs 95 pounds.

The modern Tektronix 576 scans both supply voltage polarities at the same time. Current used prices are around $2000.

The Tektronix 577 is the same as the 576 but also includes a phosphor "screen memory" which can temporarily store an I-V curve. It sells used around $1500.

October 1995 - Communications Calendar

SUN	MON	TUE	WED	THUR	FRI	SAT
1 **Huntington, IN Hamfest** **Lima, OH Hamfest**	**2**	**3** Hunt. ARES 20:00 TNT 20:00	**4** Whitley ARES 19:15 21 Repeater Group 21:00	**5** Foxtrot Net 19:00	**6**	**7** Hunt ARES 20:00 California QSO Party > VK-ZL-Ocean DX Phone >
8 Swap net 19:00 Sloppy Code 21:00 < California QSO Party < VK-ZL-Ocean DX Phone **Springfield, OH Hamfest** *Full Moon* ○	**9**	**10** Hunt. ARES 20:00 TNT 20:00	**11** Whitley ARES 19:15 21 Repeater Group 21:00 YLRL Annvsry Party CW >	**12**  **FWRC Board 19:30**	**13** < YLRL Annvsry Party CW	**14** Hunt. ARES 20:00 Illinois QSO Party > Pennsylvania QSO Party > QRP Fall CW QSO Party >
15 Swap Net 19:00 Sloppy Code 21:00 < Illinois QSO Party < Pennsylvania QSO Party < QRP Fall CW QSO Party	**16**	**17** Hunt. ARES 20:00 TNT 20:00	**18** Whitley ARES 19:15 21 Repeater Group 21:00	**19** Foxtrot Net 19:00	**20**  **FWRC Regular Meeting 19:30**	**21** Hunt. ARES 20:00 Scout Jamboree on Air > Texas QSO Party > RSGB Contest >
22 Swap Net 19:00 Sloppy Code 21:00 < Texas QSO Party	**23** < Scout Jamboree on Air 	**24** Hunt. ARES 20:00 TNT 20:00 *New Moon* ●	**25** Whitley ARES 19:15 21 Repeater Group 21:00 YLRL Annvsry Phone >	**26** Foxtrot Net 19:00	**27** < YLRL Annvsry Phone	**28** Hunt. ARES 20:00 < RSGB Contest CQ WW DX Phone >
29 Swap Net 19:00 Sloppy Code 21:00 < CQ WW DX Phone **Lebanon, IN Hamfest**	**30**	**31** Hunt. ARES 20:00 TNT 20:00  *Trick-Or-Treat*		September 1995 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30		November 1995 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Check QST and CQ for Contest Times and Rules (Times listed are in Eastern Standard Time GMT-5 hours) [Key: > Event begins < Event ends]

NET FREQS: TNT 146.76 | Murphy Swap 146.94 | Sloppy Code 7.1405 | Huntington ARES 146.685 | Whitley ARES 444.550 w/ 146.46 simplex link (WCARC net Sunday 19:45 on same frequency)

21 Repeater Group 147.150 | Foxtrot FM/AM 29.100 SSB 28.405 | **Daily Nets:** Ft Wayne 6m 50.58 (simplex) 19:00 | IMO Traffic 146.88 18:30 | Auburn 147.360 18:00
Mobile Ten SSB/CW 28.400 Saturday 19:00

THE MAYOR IS A HAM--- HE CHANGED THE NAME OF THE TOWN SO HE COULD SNAG ALL THOSE CALLING "CQ DX!"

SPECIAL SERVICE CLUB

Do you have an interesting article, news item, or cartoon which you can contribute to the Hamsplatter? Do you have some spare equipment collecting dust that you want to sell? If so, please contact me, Kris, KF9AW. My day phone is 487-3286, evenings 486-7324. Packet messages can be directed to me on 144.97, W9INX.

****

1994 MEMBERSHIP DATA: (Give this form to the treasurer at any FWRC meeting or mail to address below)

NAME_____ CALL_____ CLASS: __N__T__G__A__E

MAIL ADDRESS:_____

CITY:_____ STATE:_____ ZIP: _ _ _ _ _ - _ _ _ _

HOME TELEPHONE # (___) _____ WORK TELEPHONE # (___) _____

SHALL WE LIST YOUR ADDR/PHONE# IN MEMBER ROSTER? __Y__N ARRL MEMBER?__Y__N

****

MEMBERSHIP TERM: (JAN-DEC) (JULY-DEC, July 1-Dec.31 ONLY)
FAMILY MEMBERSHIP: _____ $21.00/yr $10.50/yr immediate family(list all calls)
REGULAR MEMBERSHIP:_____ $15.00/yr $7.50/yr licensed member
STUDENT MEMBERSHIP:_____ $ 6.00/yr $3.00/yr full time student
ASSOCIATE MEMBER: _____ $15.00/yr $7.50/yr unlicensed member
YOUR CHECK NUMBER #_____ PLEASE PAY BY CHECK, IT'S EASIER FOR BOTH OF US!

****

FORT WAYNE RADIO CLUB MEMBERSHIP HANDBOOK (Request one from President at any Regular Club Meeting)
Provided at no cost to club members, this handbook provides a full set of information about present and past Club activities, events, and functions. The handbook is available in a clear cover binder, and is upgradeable by easy insertion of new pages into the three-hole binder.

The Fort Wayne Radio Club - Celebrating 75 years of Service

BOARD OF DIRECTORS: CAROLE BURKE WB9RUS DAVE EVANS N9LOV
WALT WOOD N9AVR RON BISHOP N9HZH

Repeaters:

Audio 146.16/.76 449.875/444.875
Autopatch 146.31/.91
Fast Scan TV 439.25/910.25 (Video) 144.34 (Aux sound input)

HAMSPLATTER

September 1995

FORT WAYNE RADIO CLUB
Fort Wayne, Indiana

The Fort Wayne Radio Club
P O Box 15127
Fort Wayne, IN 46885

BULK RATE
U.S. POSTAGE
PAID
FORT WAYNE, IN
PERMIT 2072

To:

K9OMA/KA9YYI
JIM & ANNE PLIETT
16702 WAPPES RD.
CHURUBUSCO,IN 46723